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Theater Ballistic Missile Defense, an Achilles Heel for the United States?

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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Abstract

Theater ballistic missiles are a real and growing threat for US forces. The US is approaching the problem in its traditional manner of developing new high-technology systems to counter the weapons. For at least the next ten years there will likely be a shortage of active defense systems available to the theater commander. First the commander must recognize the potential seriousness of the problem. Ballistic missile defense considerations must then be incorporated into operational plans from the outset. Some specific recommendations are given for the commander to be considered as methods to mitigate the shortage of active defense systems.

Introduction

There has been an enormous amount of focus on technology in the United States military over the last few decades, especially since Operation Desert Storm in 1991. Today the Air Force is purchasing three stealth aircraft and a host of precision guided munitions. The Navy is also purchasing a host of precision guided munitions, highly automated surface ships and advanced submarines. The Army is equipping for the "digital battlefield" as they develop a concept that relies heavily on advanced technology called Force XXI. Both the Army and Navy are pursuing Theater Ballistic Missile Defense (TBMD) programs. The Army with Patriot Advanced Capability (PAC-3) and Theater Area Air Defense (THAAD). The Navy with Area and Theater TBMD systems built around the AEGIS surface ships. Currently, our Armed Forces are the best trained, best equipped and most ready force in the world.[1] With the addition of systems such as those listed above the Joint Chiefs of staff believe we will remain the world military standard.[2]

The United States has been involved in a number of one sided operations over the last 20 years, from Grenada to Desert Storm and Desert Fox, that have highlighted not only our technological superiority but, with the fall of the Soviet Union, our military dominance in the world today. We have developed joint warfighting doctrine, increased joint training and joint professional military education. There has been intense internal focus on the size, composition and missions of our armed forces. With this current situation it would be easy for the American people and indeed those in the military to become satisfied, if not complacent, with the status quo.

Over the last decade many of our potential adversaries have learned from the United States the value of high technology and standoff weapons. Just as the U.S. and coalition partners devastated a numerically superior force, some of our potential adversaries are seeking ways to accomplish their political goals with advanced weaponry.

This paper will discuss one area that should be of great concern for the Theater Commander - the problem of operational protection over the next 10 - 15 years. Specifically, it will discuss how the proliferation of Theater Ballistic Missiles, despite the global dominance of the U.S. military, could potentially become the Achilles' heel for U.S. military operations in the future.

Background

Since the end of the Cold War and the breakup of the former Soviet Union, the U.S. military has gone through enormous change. The focus of the military over the 40 years of the Cold War was one of containing the Soviets should a large-scale conflict occur. The Navy focused on Open Ocean training for "Blue Water" warfare and nuclear deterrence. The Air Force spent a great deal of effort on strategic nuclear deterrence. The Army had a large forward deployed force that was pre-positioned in Europe to delay any Soviet advance while the U.S. and NATO allies mobilized to defeat the attack. During the 1990's, large cuts in the size of the U.S. military accompanied drastic change in the focus of the services as well. The U.S. military is now largely based in the Continental United States (CONUS).[3] Although there still are troops forward deployed to several places throughout the world, there is a much higher likelihood that the next major conflict will require a large, rapid mobilization than during the cold war. The National Military Strategy of the United States emphasizes that the

U.S. will remain engaged globally to shape the international environment and respond to the full spectrum of crises in order to protect our national interests. It lists as the first strategic concept: Strategic Agility - the timely concentration, employment and sustainment of U.S. military power anywhere, at our own initiative, and at a speed and tempo that our adversaries cannot match.[4] To summarize the National Military Strategy and Joint Vision 2010, the U.S. intends to field a force that is light, rapidly deployable, and capitalizes on advanced technology to quickly bring enough firepower into a theater to overwhelm any adversary.

Operations Desert Shield and Desert Storm can illustrate what the shift in location of U.S. forces could mean in a future conflict. The environment that the six-month build up of U.S. and coalition forces operated in was very favorable, despite what was portrayed in the popular press at the time. The theater had deep-water ports and airfields that were available and suitable for the enormous build up of forces. Although the 100,000 plus Iraqi troops that were occupying Kuwait posed a serious threat and increased the urgency of the deployment of forces, the U.S. and coalition forces were able to enter the theater unopposed. The Kingdom of Saudi Arabia provided massive host nation support. The magnitude of the logistic effort was unprecedented. In the first 30 days of Desert Shield, over 38,000 troops and 163,581 tons of equipment were shipped to the theater. Also, all 38,000 troops and almost 40,000 tons of the equipment were airlifted into the theater in those 30 days. The logistic effort was larger than the initial phases of World War II, Korea, or Vietnam.[5] In future conflicts our forces will likely need to move vast amounts of equipment and material into the theater, perhaps using forcible entry. In these circumstances securing ports and airfields early in the conflict will be absolutely critical to the success of the operation.

Since Operation Desert Storm, U.S. military operations have relied heavily on advanced military technologies, some of which have been shown live on the Cable News Network (CNN) and other popular media sources. Our potential enemies have been able to watch live coverage of Tomahawk and Conventional Air Launched Cruise Missiles (CALCM) exploding in Iraq. The ability of the U.S. military to strike targets from long distances, far outside the opponent's reach, has become a powerful tool of our military. Similar advanced technologies to those used by the U.S. against Iraq, the Sudan, and Pakistan have been developed or purchased by countries that are potential enemies of the U.S. Many countries appear to have learned the value of standoff weapons as thousands of Short Range and Theater Ballistic Missiles (SRBM and TBM) are currently deployed in up to 30 countries - some of which are quite hostile to the U.S.[6] Countries such as Iran, Iraq, Libya, North Korea, Pakistan, India, China and Syria are among those that have deployed TBMs. More than 25 nations have or are developing weapons of mass destruction (WMD), either chemical, biological or nuclear[7]. The highly publicized Iraqi Scud missile attacks on Saudi Arabia and Israel during the Gulf war have shown these same countries that when faced with vastly superior military strength even inaccurate TBMs armed with conventional warheads can be a powerful political tool. Iraq was able to occupy a substantial amount of the Coalition armed forces with a few TBMs. The spread of the guidance technology that allowed the U.S. cruise missiles to attack the full depth of the theater so successfully, with only a 1000 pound warhead, has been successfully restricted through non-proliferation efforts. Although in many ways the effort to control advanced technologies has been a success, many of the Third World nations are compensating for the lack of accurate guidance systems with brute force - TBMs with WMD warheads[8]. This has become very troubling to

many U.S. leaders. Secretary of Defense Cohen was quoted in 1997 "[We are] allocating substantial resources to advance essential BMD goals, and are proceeding as rapidly as is technologically sound." Later, in 1998, following the launch of the North Korean Taepo Dong missile in August Cohen said, "[the missile firing] really got everyone's attention"[9]. General John Tilelli, CINC U.N. and Combined Forces Korea, stated before Congress that "TMD is my top priority. Patriot alone cannot adequately protect all of the key facilities and nodes...A complete defense requires an upper and lower tier of defense."[10]

Theater Ballistic Missiles

Theater ballistic missiles are usually defined in literature as having a range of 100 to 3000 Km. Joint Publication 3-01.5, Doctrine for Joint Theater Missile Defense, defines theater missiles as "A missile which may be ballistic, cruise, or air to surface (excluding short range missiles such as maverick) whose target is in a given theater of operation."[11] For the purposes of this paper, the U.S. joint definition will be used. When most think of TBMs, they think of the Soviet designed Scud missile, which is a reasonable impression. Western nations have not fired or sold TBMs that have been used in combat since the Germans fired over 2300 V-2s* at the end of World War II. Since then, except for 23 FROGs launched by the Egyptians during the 1973 war, all other combat firings of TBMs have been Scuds or variants of Scuds. In the Iran-Iraq war, approximately 350 were launched; Libya launched 2 in retaliation for the U.S. bombing of Quaddafi's headquarters; over 2000 were used in the Afghan war; and 88 were fired in the Gulf war in 1991.[12]

* (V for vengeance)

To understand the nature of the TBM problem, it is useful to review the Scud missile, its use in Desert Storm and the success of the Coalition "Scud Hunt". The Scud missile, introduced in 1962, is one of the oldest and least capable of the threat systems. It comes in several variants that are 11-12 meters long and are generally carried on an 8-wheeled transporter erector launcher (TEL), although they can also be carried on a towed mobile erector launcher (MEL). The TEL is about the size and shape of a medium sized truck (when the missile is lowered, transport condition) at 4 meters wide and 13 meters long. It can travel at speeds of 55 Km/h and a distance of 650 Km unrefuelled.[13] The TEL can be taken from a hidden location to a pre-surveyed location and fired in as little as 17 minutes. The similarity to other vehicles, combined with its mobility, make the TELs extremely difficult to locate and destroy in the short time it takes to leave a hiding place, fire their missiles, and return to concealment. The various Scud missiles have ranges from 260 Km to 900 Km. During Desert Storm the Iraqis fired 88 Scud missiles at Israel and Saudi Arabia, creating relatively little damage but forcing a major diversion of air resources to the coalition effort in "Scud hunting"[14]. The coalition dedicated 75 to 160 sorties per day and over 4,700 total sorties for anti-Scud missions. Although a vast amount of effort was expended to counter the Scud threat, with 42 instances of F-15Es being directed to an area of a Scud launch, there were no confirmed kills of a mobile launcher. This is particularly noteworthy since the conflict was very favorable for the use of air power. The terrain offered relatively few hiding places, weather was generally conducive to air strikes, and the coalition aircraft enjoyed air superiority.[15] The effect of the 88 Scud launches was relatively minor in strict military terms - 7 Israelis killed and a few dozen wounded, 28 American servicemen killed. The political effect was enormous however:

> Lieutenant General Horner noted in 1993, "I have never seen anything like the terror that was induced on the civilian populace of Tel Aviv and Riyadh from the Scud bombing."[16]
> General Schwarzkopf stated "We received a report that a Scud fired at Dhahran had struck a U.S. barracks. The explosion killed 28 troops and wounded many more. It was a terrible tragedy...it brought home once again to our side the profanity of war. I was sick at heart."[17]
> Gordon and Trainor reported in "The General's War", "In the inner councils of the Bush administration, no problem worried officials more than what might happen if Israel entered the war."[18]

The U.S. leaders were so concerned about the threat to Israel and the effect that Israeli counterattacks might have on the cohesion of the coalition that they made the decision to deploy 2 Patriot fire units from Germany to Israel. This hasty deployment diverted over 240 sorties from 50 C-5As at a time when strategic airlift was critically short.[19] The Patriot deployment to Israel demonstrated U.S. support of the country and did much to calm panic in the civilian population. Its actual military success is still controversial, however. The Department of Defense estimates that 52 percent of the Scuds were destroyed but the Israeli Defense Force claims these results were greatly exaggerated.[20] Although Scud attacks had been a part of U.S. Central Command war games in 1988 and 1990, LTG Horner and Gen. Schwarzkopf learned only the limited military effects of the weapons, failing to learn the possible political and strategic effects. Following the conflict, LTG Horner stated "If there was a success on the enemy side, I only see it as one, and that was the ballistic missile (Scud). I think that was a surprise that we should have known....The lesson was there. We failed to glean it."[21] The lesson for future operational commanders is that TBMs can have strategic consequences. Armed with weapons of mass destruction, a TBM can threaten the operational center of gravity directly by targeting the enemy's force power projection capability.

Theater Ballistic Missile Defense

TBMD is "inherently a joint mission.[22] The joint mission has developed into 4 operational capability elements: Active Defense, Attack Operations, Passive Defense, and Command, Control, Communications, Computers and Intelligence (C4I).[23]

Active defense is inherently difficult since it relies on a very short timeline, requiring a system to detect, track, and engage a very high speed target. For this reason the defense is being developed as a defense in depth with several layers or "tiers". The first layer of defense is conceived as a boost-phase layer with airborne lasers attacking missiles early in their profile during the boost phase. This would be particularly valuable when the missiles are armed with WMD since the warheads should still be in enemy territory. The next layer is the upper tier defenses. This concept would have long-range interceptor missiles from the land-based Theater High Altitude Area Defense and the sea based Navy Theater Wide programs. These systems would intercept any missiles that survive the boost phase interceptors, would cover large areas, and intercept WMD warheads at high altitudes, reducing the chance of hazardous materials landing on friendly personnel. The last layer of defense is called lower tier. Currently, all active defenses are built around two lower tier systems, the Patriot and Hawk missile systems. With Hawk having limited capability, the primary system in use today is called Patriot Advanced Capability 2 (PAC-2) which is a modified Patriot system containing software enhancements and guidance enhanced missiles (GEM) that provides point TBMD capability. The Patriot Advanced Capability 3 system, now under development, will enhance maneuvering capability and add a hit to kill missile that will improve the chances of destroying WMD warheads. The Navy Area Defense

program, also in development, is a sea-based, lower tier interceptor built around the Standard Missile 2 and the AEGIS radar system. These lower tier systems, with moderate velocity missiles, have limited capability against the longer range ballistic missiles that travel at high speeds, particularly when the missiles are carrying WMD, since these warheads can still disperse hazardous materials when intercepted at low altitudes.[24] All of the lower tier systems have a limited missile capacity and are thus subject to saturation in the event of a large scale attack.

Attack operations are the second element of TBMD. Attack operations have been likened to shooting down the archer rather than the arrow. As can be seen from the analogy, this is the preferred method for missile defense. Locating and attacking the majority of missiles before they can be launched can increase the chances for success in the active defense. The concept of attack operations is simple, but in practice it is quite difficult, as the "Scud Hunt" during Desert Storm illustrates. Good operational intelligence would identify TBM and WMD manufacture, staging, storage, and launch sites before the beginning of hostilities. Ideally, the targets could then be attacked early in the conflict before the missiles could be launched or dispersed. Indications and warning (I&W) methods would also be developed to reduce the likelihood of surprise missile launches. A problem exists however when the conflict begins without the necessary attack assets in place or by a surprise launch of TBMs. Other scenarios exist where even with excellent intelligence on the location of the weapons prior to hostilities, pre-conflict rules of engagement would prevent their destruction. Once dispersed, the highly mobile launchers become a difficult problem. Despite significant effort to develop concepts such as Real Time Information in the Cockpit (RTIC) to allow aircrew the necessary information to successfully attack mobile launchers before they can be

hidden, it is unlikely to be successful on a large scale in the near future.[25] To be able to attack mobile launchers successfully in their short periods of vulnerability throughout a theater would require an enormous amount of airborne resources. Today, and in the near future, those assets would be of greater value attacking the manufacture, storage and staging sites. For TBMD to be successful should hostilities occur in the near future, attack operations must eliminate enough of the threat missiles to prevent saturation of the active point defenses.

The third element of TBMD is passive defense. Passive defense consists of a wide range of defense options that aim collectively to reduce vulnerability and minimize damage. It includes deception, camouflage and concealment, nuclear, chemical and biological protection, TM early warning, electronic warning, counter surveillance, recovery and reconstitution, and mobility, dispersal and hardening.[26] Passive defense is similar to attack operations in that they both are only minor modifications of more traditional operational functions. If a conflict should arise in the future against an enemy armed with missiles with weapons of mass destruction, before the full multi-tiered active defense system is deployed, passive defense will be essential to mission success. The lower tier systems will not be "leak proof".

The fourth element of TBMD is command, control, communications, computers and intelligence (C4I). Joint Doctrine for TBMD states that the role of C4I is the timely and accurate data and systems to plan, monitor, direct, control and report theater missile defense operations. Although the department of defense is developing a host of systems to improve the C4I architecture, the doctrine emphasizes that TBMD must be accomplished within the existing systems and resources of other defenses. The time critical nature of defending

against high speed missiles makes it an absolute requirement that there be complete system and procedural interoperability throughout all of the services. This is so critical that the doctrine cautions Joint Force Commanders to be particularly sensitive to exercise C4I in order to ensure the ability to provide near-real-time response to theater missiles.

All of the systems described above that make up the multi-tiered theater missile defense system are complex, many employ risky technologies, as the recent string of failures in the THAAD program can illustrate, and all are very expensive[27]. The Department of Defense plans to spend 12.5 billion dollars on ballistic missile defense during the years 1998-2003.[28]

Operational Protection

At the operational level of war, joint and combined forces within a theater of operations perform subordinate campaigns and major operations - they plan, conduct and sustain operations to accomplish the strategic objectives of the unified commander or higher military commander.[29] Historically, operational protection has involved issues such as fortifying positions, defending coastlines, organizing air defense, protecting lines of communications, and other rear area functions. Operational protection can require a substantial amount of resources and if not given adequate attention can result in serious losses. Protecting forces has given many commanders difficulty. For example the Soviets claimed that during World War II, partisans behind German lines on the Eastern Front killed 300,000 Germans, destroyed almost 1200 trucks, 500 airplanes, 400 guns, 4000 trucks, 900 supply depots and thousands of rail and road bridges. By 1942 the Germans were devoting 15 divisions to rear area protection and by 1943, 25 divisions. More recently, the

Mujahedeen attacked Soviet communication and logistical units with such success that it resulted in the loss of significant resources and the commitment of large numbers of Soviet combat troops to rear protection operations[30]. Forces in the rear of the battle generally contain command and control elements, supplies, and reinforcements, thus, they are critical for the support of the battle. At the operational level of war, forces in the rear allow the sequencing, agility and synchronization needed for initiative and depth in the conduct of campaigns and major operations.[31] Between the major World Wars two advances in technology drastically changed force protection issues for the operational commander - submarines capable of sustained operations and air power, particularly carrier air power. These technological innovations significantly changed the nature of the conflict, particularly operational protection during World War II. The great maneuverability of both of these new weapons of war allowed strikes deep behind enemy lines, severely hampering merchant shipping and creating real problems for theater commanders. The threat of attack from Japanese aircraft was one of the major factors that led the allies to adopt an island hopping campaign to permit friendly land based air power to protect landing forces. The allies created similar problems for the Axis by using air power to strike directly at strategic targets deep inside Germany, Italy, and later Japan. U.S. forces, and submarines in particular created such a serious shortage of fuel oil in Japan, that the majority of the Japanese Navy was forced to operate from the East Indies to shorten supply lines. Operational commanders on both sides were forced to commit significant resources to protection, including large numbers of anti-aircraft artillery and fighter aircraft. By recognizing the power of the new technologies between the wars, allied commanders were able to develop depth charges, destroyer screens, carrier air power, fighter tactics and anti-aircraft artillery to deal with the rising threats.

Today, with the proliferation of theater missiles, operational commanders face a similar although more difficult problem as commanders between the wars. Although TMs have similarities to air power in that they can strike directly at tactical, operational and strategic targets simultaneously, TMs are much less vulnerable on the ground, can be launched from almost anywhere, do not require skilled operators and can be produced in quantity easier than modern aircraft. TMs also do not need escorts or screens and can be launched in salvos to overwhelm defenses. Consider for example, during the initial stages of Desert Shield, Iraq may have initiated an attack by launching Scud missiles armed with chemical weapons simultaneously at the port facilities in Saudi Arabia, the coalition armored divisions deployed south of Kuwait and Tel Aviv. Clearly the problem for General Schwarzkopf would have been serious. As it was, the crude, inaccurate, conventionally armed Scuds created significant difficulty for the CINC.

Defending against the threats of today requires detailed planning and difficult decisions. Two excerpts from the U.S. Army Field Manual for Operations are good examples of current doctrine:

> The effects of these [WMD] weapons on a campaign or major operation - either through use or the threat of use - can cause large-scale shifts in tactical objectives, phases, and courses of action. Thus, planning for the possibility of their use against friendly forces is critical to campaign design.[32] The potential for catastrophic loss of soldiers, time, or initiative, forcing a change to operational objectives, requires a greater role for theater missile defense when generating combat power at the operational level.[33]

Ideally, the comprehensive defense in depth that is envisioned in the Joint Warfighting Science and Technology Plan would be available to the commander. This "system of systems", if properly developed and integrated into joint doctrine and training would make

the problem of theater ballistic missile defense easily manageable. For at least the next five to ten years however, the U.S. must rely on 10 Patriot Battalions with 46 fire units and perhaps a limited number of AEGIS surface ships for point defense.[34] During a major conflict against a foe armed with TMs, there will almost certainly be a limited number of point defense systems available. If forced entry is required, getting the bulky Patriot fire units into the theater will require difficult choices indeed. The commander will be faced with the choice of using 301 C-141 sorties for a Patriot battalion with one full missile reload for missile defense or using that same lift to bring power projection forces into the theater.[35] The initial force deployment decisions will often be the most critical. In the most difficult case, where combat has not yet begun, but the enemy is capable of sudden, effective opposition, the commander must seek to balance the protection of his force, efficient deployment and a range of response options in the event of attack. Forces are "acutely vulnerable" during initial theater entry when the enemy possesses WMD.[36] Weighing the forces too heavily on the side of force protection would also have negative consequences if the commander loses sight of the objective of the mission. Force protection is a function that facilitates the mission, not an end in itself. Just as the allies focused the majority of their efforts on logistical sustainment during the invasion of Sicily in 1943, resulting ultimately in the escape of 100,000 Germans across the Strait of Messina to fight again, today's commanders could find themselves spending an inordinate amount of effort on force protection.[37]

Conclusion

Theater Ballistic Missiles, especially armed with weapons of mass destruction, are a serious threat to our forces today. They are currently in the inventories of several countries

that are openly hostile to the U.S. The trend for these weapons is toward increasing range, accuracy and lethality.[38] The traditional American approach to such issues has been to look for a counter weapon, a defensive system or some other technological solution. The multi-tiered TBMD system that is contained in the Joint Warfighting Science and Technology Plan, although containing some revolutionary technologies, is along the lines of the traditional American system versus system approach. This system, properly developed, and deployed would certainly reduce the TM problem for operational commanders. However, they will not be available for years to come. Additionally, new weapons alone will not solve the TM issue. Alfred Thayer Mahan's words from almost a hundred years ago apply to this issue:

> An improvement of weapons is due to the energy of one or two men, while changes in tactics have to overcome the inertia of a conservative class. History shows that it is vain to hope that military men generally will be at pains to do this, but that the one who does will go into battle with great advantage.[39]

Recommendations

Today's commanders must integrate theater missile defense into their plans from the beginning. A single missile, armed with weapons of mass destruction, hitting a landing force or a concentration of U.S. troops can force a major change in operational objectives or even have strategic consequences if the U.S. will to fight is tenuous. For this reason, every effort must be made to prevent the use of WMD by the enemy. Military commanders must work in non-proliferation efforts, in concert with other governmental agencies, to achieve maximum political pressure in order to prevent countries in their areas of responsibility from acquiring WMD. Although these efforts may not fit into what we normally envision as a "Warfighting CINC" mission, they do not differ significantly from the efforts that have become second

nature for the CINCs in military operations other than war (MOOTW) over the last 15 years.* The CINCs must ensure that their intelligence resources are used to monitor WMD production and acquisition programs, technology transfers, and to locate, detect and track shipments of WMD materials and weapons. By using his area expertise, the CINC can provide valuable recommendations for the political policy with respect to counterproliferation. When our opponent already possesses WMD, commanders must work to deter their use against friendly troops. Fortunately, the deterrence methods that helped win the Cold War will work in many cases. In others, commanders must adapt; the deterrence efforts that proved successful with the former Soviet Union may not work with Third World nations and failed states. Finding a method of deterrence that will work requires detailed study of the enemy's military, cultural and political leadership. In all cases, a method must be sought that makes it clear to the enemy that the use of WMD will not help them achieve their objectives - that the potential gain will be offset by the consequences of using WMD. This may be done through threats of an overwhelming response (as the U.S. did with Iraq during Desert Storm), or by demonstrating that the U.S. is well trained and prepared to fight in the nuclear, biological, chemical (NBC) environment. In certain circumstances, such as with terrorist groups or failed states, the enemy may not respond to threats of retaliation. They may feel that they have no other option, have nothing to lose, and thus will not be deterred. In this case, it must be assumed that the enemy will use WMD. In the event hostilities occur, commanders must realize that, as during Desert Storm, TBMD attack operations will require enormous assets to be successful. For successful attack operations, missile manufacturing,

* Recognizing the CINCs unique capability to work in this mission, the Chairman of the Joint Chiefs of Staff (CJCS), placed with them the principal responsibility for WMD counterproliferation in the (CJCS)

repair, storage, staging and launch sites need to located and analyzed for attack by targeteers. Indications and Warning (I&W) systems and methods must also be developed to prevent surprise attacks by theater missiles. Deception efforts will be critical for success - with the likelihood of limited point defense system availability for the next several years, commanders must take special care not to demonstrate to the enemy his most valued assets (those that are protected) and those that he is willing to lose (those left unprotected). With live news media coverage of U.S. operations becoming commonplace, it may be difficult to deny the enemy bomb damage assessment following missile attacks, but commanders should consider using information warfare to deny useful BDA to the enemy. During combined operations, the problem of limited active defense capability can be exacerbated. Formation of a coalition may be required for political or even military reasons but if the coalition forces have no organic theater missile defense, protecting their forces will likely be required to maintain the cohesion of the coalition. Commanders must recognize the limited active defense capability and treat it as a weakness during their planning.

During Desert Storm, the commander and his staff were well aware of the presence of the Iraqi Scud missiles but underestimated the political effect those missiles would have. In LTG Horner's words, "we were lucky". Future commanders should not rely on luck, nor should they rely on high technology alone. By unifying all ballistic defense measures - counterproliferation, deterrence, attack operations, C4I, and passive and active defenses into a comprehensive plan, commanders can ensure that the ballistic missile threat does not become an Achilles' heel for the United States.

Counterproliferation Missions and Functions Study in 1996, available at <http://www.dtic.mil>.

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